WESTERN WATER ASSESSMENT

A NOAA CAP TEAM

January 2025 Newsletter

In this newsletter...

Farewell Liz

We would like to congratulate our Water Resources Specialist **Liz Payton** on retiring in the new year! Liz worked at Western Water Assessment from 2018-2024 and was an integral part of the team.

She worked with water users in the WWA region to help them access and understand climate and hydrology information and is a trusted expert in those spaces. She was awarded the CIRES Outstanding Performance Award for her work as the Water Chapter Lead for the *Fifth National Climate Assessment* (2023), and she served as co-editor and co-author of the synthesis report, *Colorado River Basin Climate and Hydrology: State of the Science* (2020). She was also associate guest editor of the *Journal of the Water Resources Association's* featured collection, *Severe Sustained Drought Revisited: Managing the Colorado River System in Times of Water Shortage 25 Years Later, Parts I and II*, published in 2022.

Her experience includes research into climate change effects on extreme events, development of multiple handbooks and guides for water users, and river basin and municipal system water supply modeling projects across the West, including one of the first studies of climate change impacts on hydrology and water allocation in the

Colorado River basin. Liz served as the Wyoming State Engineer's technical expert in statistical hydrology in the NE v. WY North Platte River litigation in the original jurisdiction of the US Supreme Court. Liz has an MS in Civil Engineering from CU Boulder and was a water resources engineer at Hydrosphere Resource Consultants for 16 years. Prior to earning her MS degree, she taught math and science in the US Peace Corps in a remote village in western Nepal. Liz has also volunteered on city working groups and boards including chairing the City of Boulder Planning Board.

While we miss her deeply on the team and seeing her in the office every week, we wish her all the best in retirement!

Welcome Nels

We are very excited to welcome our new Hydroclimate Scientist and Community Resilience Expert, **Nels Bjarke**! Nels's expertise is in working directly with communities and agencies to build resilience, and in utilizing multiple streams of hydroclimate data to build tools and datasets that improve our understanding of how climate change has historically and will continue to impact surface water availability. Currently, he is evaluating drought of all forms across North America and the sensitivity of the classification of drought to the non-stationarity of the climate. Nels has a M.S. in Earth and Planetary Science from the University of New Mexico and a Ph.D. in Civil, Environmental, and Architectural Engineering from the University of Colorado Boulder.

Research and Products

Looking for Connections in the Rural Wildfire Recovery Arena

Western Water Assessment received Bipartisan Infrastructure Law (BIL) funding for a new collaboration with the Southwestern CAP team, CLIMAS, to improve understanding of the challenges for long-term wildfire recovery in rural communities. The project will look at rural communities that experienced significant wildfire impacts in Colorado, Arizona, and New Mexico to document the long-term challenges communities face, especially those that often remain invisible in wildfire datasets (e.g., mental health impacts, displacement, long-term health impacts, and economic precarity). The project will work with social workers and public health workers to understand these recovery dynamics and then conclude with workshops in each state

that bring together emergency managers, those in the wildfire community, and those in social services to foster longstanding relationships between these important actors.

WWA Social Sciences Lead **Katie Clifford** is in the early phases of this work and is interested in talking with folks actively involved in or knowledgeable about wildfire recovery in rural communities in Colorado. If this is you or you have recommendations for who she should talk with, please reach out at wwa@colorado.edu.

Research Article Highlight

"A laboratory-scale simulation framework for analysing wildfire hydrologic and water quality effects"

This article by recent WWA graduate student **Carli Brucker,** WWA Director **Ben Livneh**, and other researchers explores the impacts of wildfire on water quality and hydrology using a controlled laboratory setting. The study employs custom-designed burn and rainfall simulators on 154 soil samples to mimic various wildfire intensities and storm events across different terrain slopes. Key findings include a significant correlation between burn intensity and runoff, with higher burn intensities leading to increased sedimentation and runoff by 30–70%. Carbon and nitrogen levels peaked at moderate burn intensities (~250°C), showing concentrations 200–250% higher than unburned samples. The study highlights the nuanced changes in soil composition due to wildfires, emphasizing the importance of understanding these interactions for better water management in wildfire-affected areas.

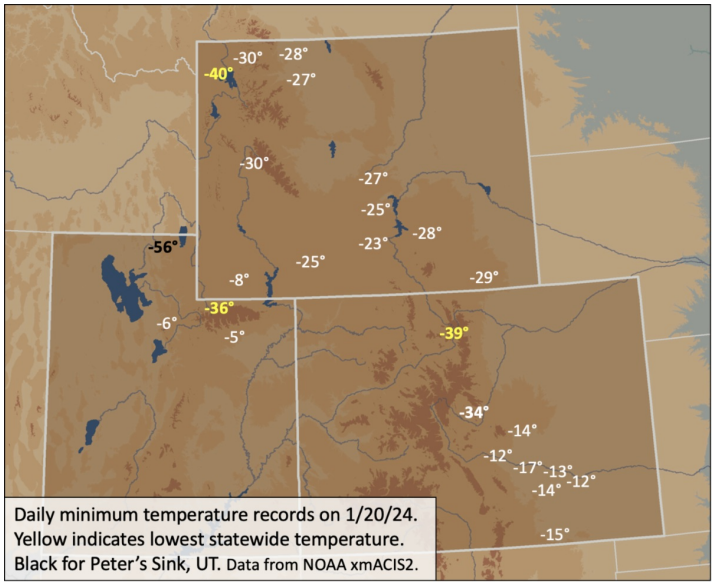
Read article

Below are two WWA webinars showcasing Carli and Ben's research related to the article.

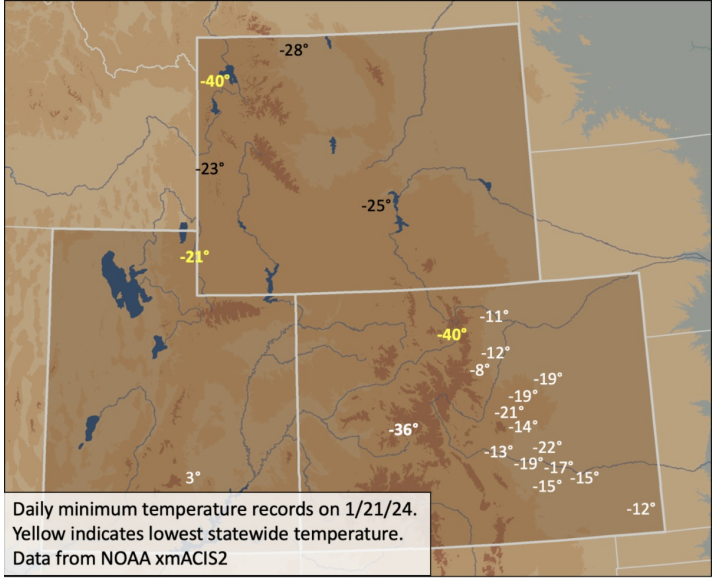
Climate Event

Polar vortex descends on the Intermountain West

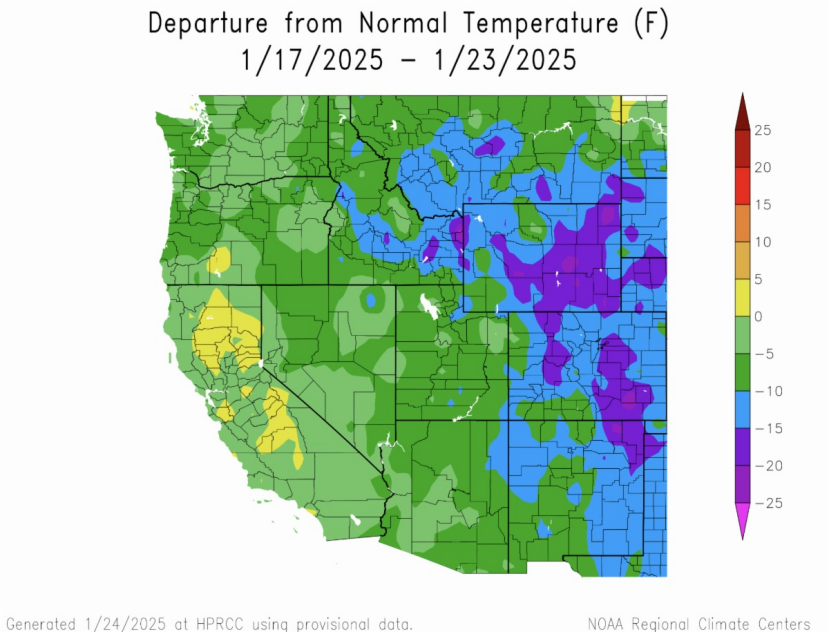
Polar vortex descends on Intermountain West. A severe cold wave impacted the Intermountain West on January 19-23. Winter cold waves in temperate latitudes are sometimes referred to as a polar vortex. A polar vortex is an area of low pressure and cold temperatures that always occurs around the North and South Poles. During winter, the polar vortex periodically expands in size and covers more temperate latitudes; this is the source of a cold wave, or Arctic blast in the United States. The severity of the cold wave peaked on 1/20 and 1/21 in Wyoming and Colorado, with slightly warmer temperatures in Utah. Considering weather sites with at least 50 years of data, daily minimum temperature records were set at 9% and 17% of Colorado sites and 21% and 5% of Wyoming sites on 1/20 and 1/21. Daily minimum high-temperature records were set at 17% of Colorado sites on 1/20 and 30% of Colorado sites on 1/21. Temperatures were particularly cold in the lower Arkansas River valley with record daily minimum temperatures of -19ºF in Pueblo and -22ºF in Tacony, CO on 1/21. In Colorado, -40ºF was the coldest temperature of the event, observed at Harbison Meadow near Grand Lake. In Crested Butte, -36ºF was the coldest temperature recorded since 2011. The coldest temperature observed in Wyoming, while not a daily record, was a frigid -40ºF at Old Faithful in Yellowstone, the coldest temperature since 2016. The cold wave was not as severe in Utah as a whole, but a unique site at Peter's Sink in northern Utah bottomed out at -56.1ºF. In case you were wondering, the coldest recorded temperature in the Lower 48 was -69.7ºF at Rodger's Pass Montana; the second coldest temperature recorded was at Utah's Peter's Sink where temperatures dipped to -69.3ºF in 1985. For the week surrounding the cold wave, average temperatures were 15 to 20 degrees below normal for large parts of Colorado and Wyoming with small areas up to 25 degrees below normal.



Daily minimum temperature records on 1/20/24. Yellow indicates lowest statewide temperature. Black for Peter's Sink, UT. Data from NOAA xmACIS2.

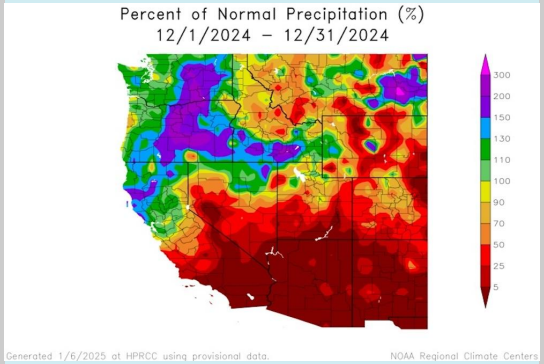


Daily minimum temperature records on 1/21/24.
Yellow indicates lowest statewide temperature.
Data from NOAA xmACIS2



WWA Features

Strike Team: Utah Making Progress on Great Salt Lake



Forecast: Colorado River flow to Lake Powell will only reach 81% of normal in 2025

Read article

Read article

A small, silver lining to the Colorado River drought

Read article

Sea Ice Melting Faster Than Ever: New Models Reveal Hidden Heat Flux

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Background photo by Ethan Knight

Western Water Assessment | wwa@colorado.edu | http://wwa.colorado.edu/

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